Don Bently's CORNER

As President of the Corporation, I have a keen interest in developing and maintaining a line of products which will be highly useful in industry. This newsletter will keep you informed about my equal interest in contributing to the advancement of understanding rotor dynamics and diagnosing machine condition.

In February, I participated in a Balancing Seminar in Houston conducted by the Vibration Institute. The topic of my presentation was "Rigid and Flexible Rotor Balancing with Polar Plots". The polar plot has proven useful not only in determining the magnitude and location of a balance correction weight — computer programs can do this, and in many cases with greater accuracy — but in also providing information about shaft mode shapes and machine unbalance response through the balance resonance (critical speed) region(s). This information is vitally important in the evaluation of a machine and is virtually ignored in most computer balancing programs.

At Bently Nevada, we have developed a "Bow Mode Demonstrator" using the same technique (phase and amplitude versus speed measurements) developed for the polar plots. A flexible plastic model of the machine shaft shows very clearly the mode shapes a rotor experiences through its critical speeds. We use this model extensively in our seminar programs.

Early in May, I presented a talk on subsynchronous vibrations due to oil and aerodynamic whirl/whip mechanisms at a symposium sponsored by the Mechanical Engineering Department's Gas Turbine Laboratories of Texas A & M University.

We participate in many other technical sessions, including the University of Virginia Industrial Program led by Dr. Ed Gunter, the Texas A & M Turbomachinery Symposium, and ASME sponsored programs. We also have representatives on committees within API, ANSI, and ISO. Not only are we able to report on our research at Bently Nevada, but we learn what other people in the field are doing.

Two recent papers of interest:

"Attitude Angle: The Key to Measurement of Stability of Rotating Machines," Donald E. Bently, Journal of the Marine Engineering Society in Japan, Vol. 14, No. 5 (1979)

"The Parameters and Measurements of the Destabilizing Actions of Rotating Machines and the Assumptions of the 1950's," Donald E. Bently, presented at Texas A & M Workshop on Instability, to be published by NASA

One last note: As a personal project, I have been gathering data and technical articles on the subject of cracked shafts. This machine malfunction is not uncommon in the field, but very little analytical documentation is available. I feel that many cracked shafts are misdiagnosed as other machine malfunctions. Further, the crack may go unnoticed until it reaches severe proportions. I would be grateful for any information you can send me including actual machine data, case histories, and crack detection methods. I will keep you informed of the progress of my work.

D.E.B.

UPCOMING SEMINARS

July 8-10	Insurance Industry Seminar	Carson City, Nevada
Aug. 4-8	Data Acquisition Seminar	Carson City, Nevada
Aug. 12-13	Field Seminar	Anchorage, Alaska
Sept. 22-26	Data Acquisition Seminar	Carson City, Nevada
Oct. 14-15	Field Seminar	Boston, Massachusetts
Oct. 21-22	Field Seminar	Calgary, Alberta, Canada
Nov. 18-19	Field Seminar	San Francisco, California
Dec. 1-5	Data Acquisition Seminar	Carson City, Nevada

If it is not possible for you to come to the above seminars, we can come to you. Our On-Site Seminars are custom-designed to fit a customer's specific needs as to content, duration and level of training presented. They are held at or near a customer's plant and can be given on two successive days. Thus, a complete shift can attend in two different groups, and overall plant operation is not impaired.

If you would like more information on any of our seminars, please check the appropriate spaces on the reply card.

LOW SPEED VIBRATION MONITORS

Do you need to monitor the casing or structural vibration of low speed rotating machinery? Bently Nevada has developed two types of systems that monitor casing or structural frequencies as low as 100 rpm. The units are designed for cooling tower fan monitor applications, but can be used to monitor other types of low speed rotating machinery.

One system, designed to be mounted near a cooling tower, features a single-channel with dual-channel option. It is enclosed in a fiberglass housing that protects it from the corrosive cooling tower environment. The other system is designed to be installed in a control room or other remote location. The monitor is a single-channel 9000 Series unit. This allows up to twelve channels to be monitored by a 9000 Series system.

The transducer system input to both the local and the 9000 Series systems is from a Velocity Seismoprobe. This unit and its interconnecting cable are designed to withstand the corrosive environment of the cooling tower without additional housing protection.

Each type of system uses a dual path monitor that splits the input from the Velocity Seismoprobe into two paths. One path is the velocity signal that is used to monitor the high frequency vibration levels. The other path is the velocity signal integrated to displacement and is used to monitor the lower frequency vibration levels. Each monitor contains special circuitry in the displacement path to compensate for the low frequency response sensitivity of the Velocity Seismoprobe. An additional feature of each monitor is a 100 rpm high-pass filter to eliminate frequencies below 100 rpm. The dual path design provides the capability of monitoring all the frequencies that are present in a cooling tower fan installation, including gear mesh, fan blade passage, motor running speed, fan running speed, and multiples of those frequencies.

For more information on either of these cooling tower fan monitors, please check the spaces on the reply card.